

Real-Time Parameter Identification

Completed Technology Project (2013 - 2015)



Project Introduction

Armstrong researchers have implemented in the control room a technique for estimating in real time the aerodynamic parameters that describe the stability and control characteristics of an aircraft. Typically, aerodynamic modeling is performed on recorded data after test flights and then used in simulations. The drawback with this approach is that if the collected data are not complete or of high quality, additional and costly flight tests must be scheduled. In this innovative approach, Armstrong's real-time parameter estimation automates the process and runs during flight, enabling researchers in the control room to evaluate and adjust flight maneuvers to ensure data quality. The technology increases the efficiency and productivity of flight tests, as researchers can determine during the tests if they have collected the data needed for specific modeling simulations.

Work to date: The technology is currently being used in Armstrong control rooms to evaluate data collected during test flights as well as in-flight maneuvers.

Looking ahead: Researchers are continuing to improve the system display and are working to refine the way results are presented. A capability to compare the estimated parameters to preflight-predicted values is being added, which will make it possible to evaluate the aerodynamic effects of aircraft modifications.

Benefits

- **Automates data collection:** Estimates in real time the parameters for aircraft stability and control
- **Improves data quality:** Enables adjustments during flight tests to ensure correct data acquisition
- **Saves time and resources:** Decreases the duration and number of flight tests

Applications

- Aerodynamic modeling

Anticipated Benefits

- **Automates data collection:** Estimates in real time the parameters for aircraft stability and control
- **Improves data quality:** Enables adjustments during flight tests to ensure correct data acquisition
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NASA Test Flight

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

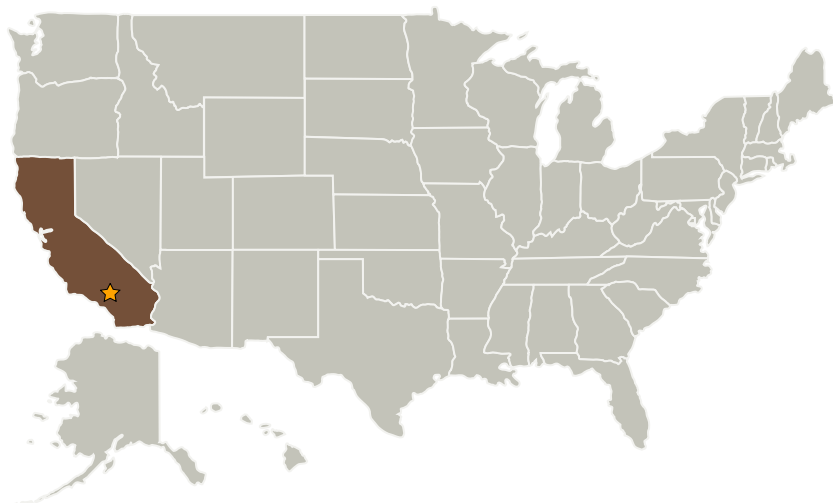
Center Innovation Fund: AFRC CIF

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Armstrong Flight Research Center (AFRC)	Lead Organization	NASA Center	Edwards, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Michael R Lapointe

Program Manager:

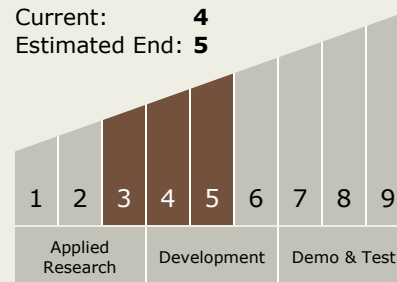
David F Voracek

Principal Investigator:

Mark S Smith

Technology Maturity (TRL)

Start: **3**
 Current: **4**
 Estimated End: **5**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - └ TX11.1 Software Development, Engineering, and Integrity
 - └ TX11.1.6 Real-time Software



Images



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(<https://techport.nasa.gov/image/16326>)